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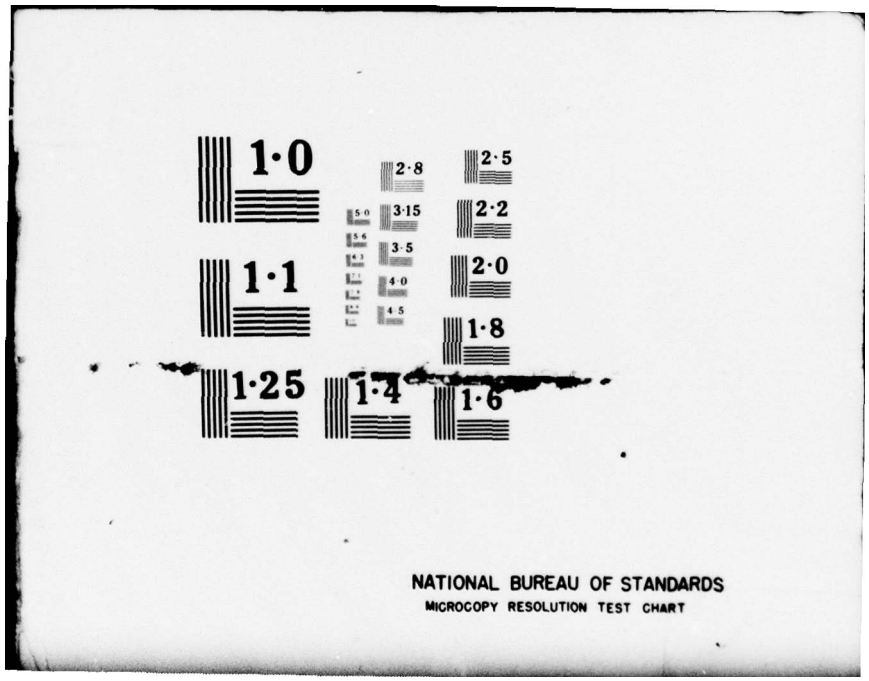
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ANALYSIS OF EXPANDED APPLICATION OF SHIP SYSTEMS DEFINITION AND INDEX (SSDI)

July 1975

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Prepared for

PEARL HARBOR NAVAL SHIPYARD
Honolulu, Hawaii

Under Contract N00604-75-C-0276

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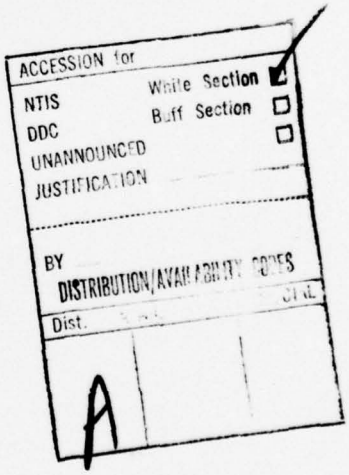
ABSTRACT

Potential applications of the Ship Systems Definition and Index beyond its present usage as an overhaul preparation aid were investigated. A broad spectrum of Navy management functions and tools were examined relative to SSDI applicability, with conclusions and recommendations offered for each.



SUMMARY

This study demonstrated that the Ship Systems Definition and Index (SSDI) has potential application beyond its present usage as an overhaul preparation aid. Potential SSDI applications to various functions and tools associated with ship maintenance management are summarized in Table A.

Certain general advantages and limitations apply when considering the utilization of SSDIs based on Ship Work Breakdown Structure (SWBS) coding as a common communication medium. The advantages are that the SSDI:

a. Permits rapid and accurate coding of ship systems/equipments to five levels of complexity.

b. Identifies ship system/equipment boundaries and interfaces. Since this step has to be taken every time many of the management aids listed in Table A are applied, use of SSDI precludes the necessity of continually redefining work packages.

c. Expands on the usefulness of the SWBS code. Many management aids and systems utilize the basic (three-digit) SWBS supplemented with sequence numbers as a means of identifying items. Use of SSDI would provide a standard means of coding items to two additional levels of detail.

The principal limitations associated with the use of SSDI are:

a. The widespread use, exclusively in some management systems, of the "competing" Equipment Identification Code (EIC). Application of SWBS to such systems would necessitate either 1) the conversion of those systems to SWBS coding, 2) the provision in those systems for SWBS as well as EIC coding, or 3) a means of cross-referencing the SWBS and EIC numbering systems.

b. The necessity of making minor revisions to existing instructions, such as for Technical Repair Standards, Ship's Force Overhaul Management System, etc.

To fully utilize the advantages of the SSDI concept, its coverage could be expanded as specifically recommended in Table A, and generally as follows:

a. Structuring a "universal" SSDI, based on the SWBS Master Index; and

b. Building tailored SSDIs for individual ship classes.

TABLE A. SUMMARY OF POTENTIAL EXPANSION OF SSDI (Sheet 1 of 2)

Function/ Tool	Application	SSDI Requirements	Benefits	Constraints	Conclusions	Recommendations
3M/MDCS, including CSMP	Code work requests (form 4790/2K) in lieu of or in addition to EIC.	Master SSDI	Provide more logical and accurate basis for performing any type of cost/performance/ reliability/etc., analysis based on ship systems/ equipments.	Would require replaceing EIC with SWBS.	Would be costly to replace EIC with SWBS.	Cross-reference new SSDIs to EIC to extent possible. Consider adding SWBS code to MDCS reporting documentation.
POT&I	Use SSDI to identify and define the systems/ equipments to be inspected.	Additional class SSDIs	Each inspection record would have a unique code. Would provide a checklist to aid in defining POT&I items.	Would require revising instructions for preparing POT&I plans.	Application is feasible and would provide for better definition of individual inspection records. Only minor changes would be required to existing instructions.	Prepare a POT&I plan for a future overhaul organized to conform with SSDI.
SARP	Assign fifth-level code to "job" key operations and/or replace present SWLIN number.	Additional class SSDIs	Ties together POT&I, SFOMS, work specifications, material ordering data, etc. Serves as a checklist for defining items for preparation of work specifications.	Cannot include more than one fifth-level item in one key operation. Would require restructuring SWLIN.	Application of SSDI to SARP is feasible and is presently being accomplished at PHNSY. Further work is required to obtain full benefits.	Analyze present application of SSDI to SARP for USS WHIPPLE to identify areas for improvement, and implement improvements in next SARP prepared.
Material Ordering	Assign fifth-level SWBS code on JMLs.	Additional class SSDIs	Would tie together material ordered with SARP item and work specifications, and simplify historical data retrieval.	Requires changing instructions for preparing JMLs.	Application of SSDI to material ordering is feasible and will be accomplished by PHNSY.	Analyze current efforts at PHNSY and apply to a follow-on overhaul. Continue to construct a material-ordering data bank and assign SWBS codes.
Work Packaging	Use as reference/ checklist for defining work packages.	Addition class SSDIs	Would simplify packaging of work by systems/ subsystems.	Not generally suitable for work packaging by area.	Is feasible for use as a reference for system work packaging.	Use as a reference for work packaging by system, and document results. Conduct further study as to applicability for work packaging by area.
Shipboard Equipment Validation	Assign fifth-level SWBS code to SECAS HM&E validation aids.	Additional class SSDIs	Better definition of CID-numbered valaids to specific systems where installed. Ensures that all systems are validated.	SSDI has to be available at start of validation for full benefits.	Is feasible to use for validation, and would be useful in organizing the validation and in ensuring complete coverage by the validation team.	Provide SSDIs for use in future ship HM&E validations. Investigate applications of SSDI for SECAS electronics validations.
INSURV	Coding discrepancies.	Master SSDI	Provide interface with other systems/tools.	Would require restructuring INSURV discrepancy coding system.	SSDI not considered applicable at this time.	Provide INSURVs a copy of SSDI and invite comments on possible applications.
Drawings/ Manuals	Developing cross-index to plans and manuals, and a reference to locating specific plans/ manuals in their appropriate index.	Additional class SSDIs.	Provides reference for locating plan and manual numbers. If a cross-index to each level of SSDI existed, would be a valuable planning tool.	Requires developing a cross-reference.	Application of SSDI to plan/ manual numbering not feasible – they already use SWBS.	Develop index of plans/ manuals to each level of SSDI.

TABLE A. (Sheet 2 of 2)

Function/ Tool	Application	SSDI Requirements	Benefits	Constraints	Conclusions	Recommendations
SAMIS	Coding ship alterations.	None	Provide identification to other systems/tools. Shipalt records do not have an SWBS assigned.	Require extensive changes to shipalt program.	Application not feasible to numbering shipalts. SSDI can be used for coding shipalts into SARP.	Conduct further studies of possible applications.
URWR (SWAB)	Work description sheet definition and coding.	Master SSDI	Would augment boundary descriptions and permit better definition.	None	SSDI and URWR programs mutually support each other and should be expanded.	Institute study to prepare URWRs related to a current SSDI, realigning SSDI as necessary to obtain improved set of documents for maintenance management.
Standard Work Specs.	Coding specifications.	Additional class SSDIs	Provide specific tie-in with other types of documentation.	None	SSDI can be used to code standard work specs.	Conduct further study into identifying standard work specs with a fifth-level SWBS code as additional class SSDIs become available.
TRS	Coding TRSs.	Master SSDI	Provide cross-reference between equipment and specific systems.	None	SSDI can be used to provide a cross-index code between TRSs and ship systems.	As TRSs are developed, continue to assign SWBS code for data bank retrieval.
SFOMS	Coding work items and standard items and estimating guidelines.	None	Provide interface with shipyard MIS program and provide checklist.	None	SSDI should be used as reference for additional coding of ship's force work to provide cross-referencing to other maintenance management programs.	Continue to apply SSDI concepts to SFOMS. Encourage participation by ship's force.
Total Ship Test Program	Provide reference for developing the program.	None	Provides checklist for identifying systems and interfaces.	None	SSDI can be applied.	Provide SSDI for reference use by personnel developing total ship tests and trials.
Shipyard MIS	Provide coding for all segments.	Additional class SSDIs	Provide common language with finer definition.	Limited to ships where SSDI has been prepared.	Can be applied, and provides an additional degree of definition.	Continue to apply SSDI concepts to MIS where applicable.
PEB/LOE	Use SSDI to identify systems, subsystems, and equipments to be considered.	Additional class SSDIs	Ensure complete system coverage and provide interface with other systems/tools.	None	SSDI is applicable as a reference document for PEB/ LOE preparation.	Continue to provide class SSDIs for use during PEB/LOE preparation.

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1
INTRODUCTION

The Ship Systems Definition and Index (SSDI) was developed as a management aid in preparing for ship overhaul. SSDIs define ship systems in a manner that facilitates the preoverhaul inspection conducted to determine work requirements, and provides a means of logically organizing the overhaul work package. However, a potentially broader usefulness of these diagrams became apparent after they became available to the maintenance management community and underwent several cycles of refinement. An investigation to evaluate the applicability of SSDIs to other ship-related functions and activities has been conducted by ARINC Research Corporation under Contract N00604-75-C-0276, and the results are presented in this report.

For this study, the following task objectives were established in conjunction with personnel of Pearl Harbor Naval Shipyard:

a. Identify the maintenance management functions to which the SSDI is potentially applicable.

b. Analyze the benefits and constraints associated with such applications.

c. Formulate conclusions regarding the feasibility of application in terms of technical, administrative, and economic factors.

d. Determine any associated requirements for refining the SSDI concept.

Section 2 of this report describes the SSDI concept and its present applications. Based on those applications and the potential inherent in the SSDI concept, Section 3 addresses the task objectives listed above.

2
DESCRIPTION OF SSDI

2.1 OBJECTIVES OF SSDI

The Ship Systems Definition and Index is an orderly identification and structuring of the systems and subsystems that make up a total ship. The SSDI defines the systems as well as their boundaries and interfaces, creating a common language for communicating information about a ship's configuration. As illustrated by Figure 1, the SSDI is designed to:

a. Provide a five-level breakdown of a ship's configuration, with the ship completely defined at each level.

b. Utilize the Ship Work Breakdown Structure (SWBS) coding, expanded to accommodate the five-level breakdown.

c. Tailor the SWBS to the configurations of specific ship classes or individual ships.

2.2 SSDI CODING

The Navy uses two principal coding systems for classifying ship systems, subsystems, and equipments – the SWBS and the Equipment Identification Code (EIC). EICs are the primary means of identifying shipboard systems, subsystems, and equipments when documenting actions in accordance with the procedures of the 3M system. The early SSDIs were structured to this language.

The SWBS is a general-purpose common language to be used throughout a ship's life cycle, from early design and cost studies through production and subsequent use and disposal. The SSDI serves to identify ship systems/equipments in documentation relating to cost, weight, performance specifications, system function and effectiveness, design, production, and maintenance. It combines into a single system the functions formerly served by the Bureau of Ships Consolidated Index (BSCI) and the Standard Subject Identification Code (SSIC). The SWBS language system is the core of the most recent SSDI set, tailored to DE-1052 class ships. The Navy's intent is that the future SSDIs also be SWBS-coded.

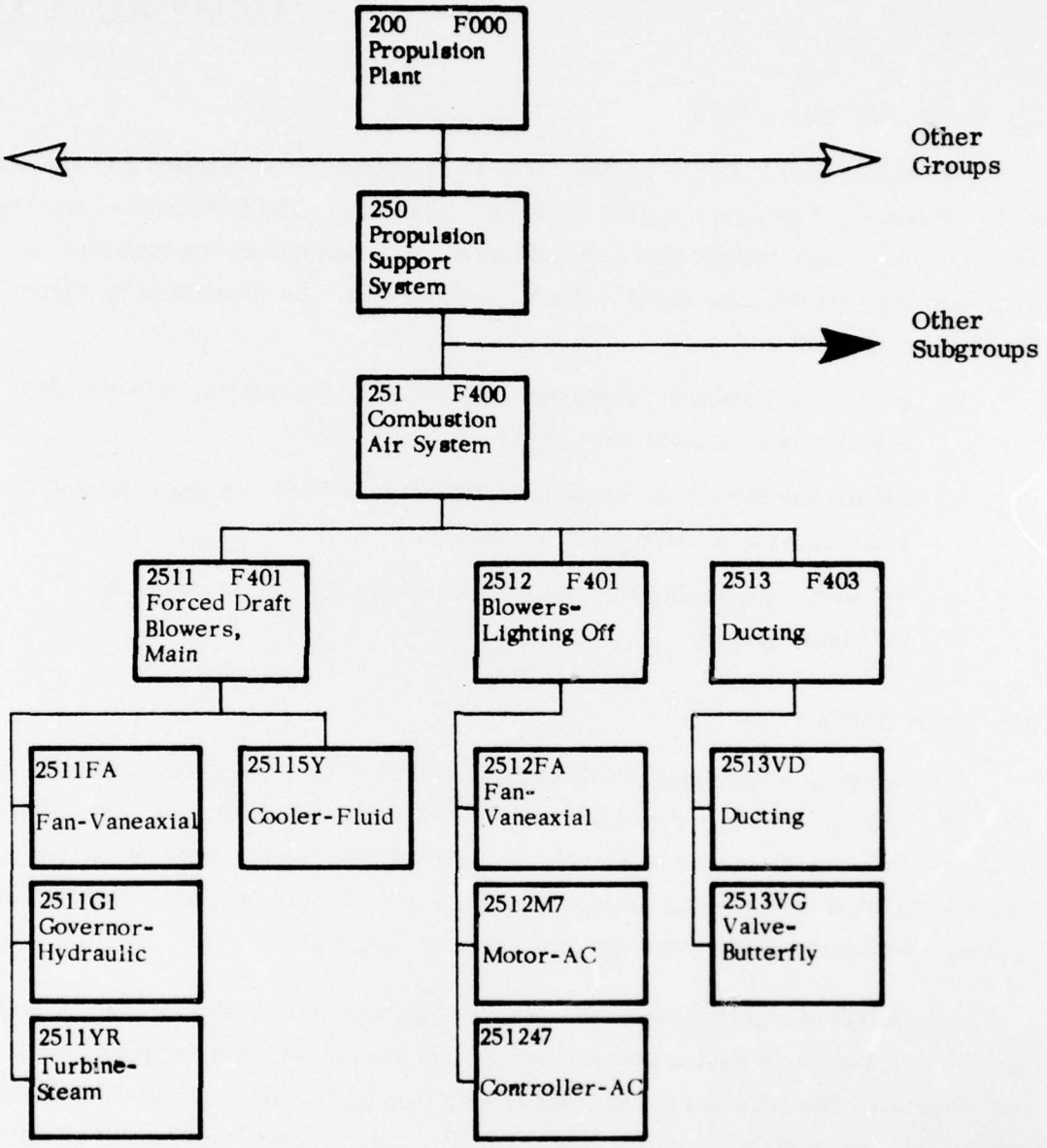

Figure 1. Portion of a Typical Ship's System

To provide more precise identification of shipboard equipments, the three-digit SWBS has been expanded for SSDI usage to include a fifth-level equipment coding list developed by SECAS. The use of the expanded code is illustrated below for a propulsion plant subsystem ac motor of greater than 3 horsepower (SSDI code 2512M7):

SSDI Breakdown	Example Unit	Code Number
Group – 1st Character	Propulsion Plant (200)	2
Sub-Group – 2nd Character	Propulsion Support System (250)	5
Element – 3rd Character	Combustion Air System (251)	1
Subelement – 4th Character	Blowers - Lighting Off	2
Component – 5th/6th Character	Motor - AC, Over 3HP	M7

2.3 SSDI DIAGRAM TYPES

The SSDI contains two types of illustrations: 1) the system diagram, or basic structure; and 2) the line diagram, which provides supplementary information on an as-required basis. Each of these diagram types is discussed below.

2.3.1 System Diagram

An SSDI system diagram is prepared for each major ship system (hull structure, propulsion, etc.). As illustrated by Figure 2, the system diagram identifies:

a. System equipments

b. System boundaries

c. Key maintenance items within each system

d. Shipboard maintenance work centers

e. Where further detail can be obtained on complex portions of the system (i.e., reference is made to an SSDI line diagram).

2.3.2 Line Diagram

In some cases, notably for piping and electronic systems, the system diagram does not make clear the boundaries and interfaces associated with certain system elements. In those instances, a line diagram provides the needed clarification. Refer for example to Figure 3, a line diagram of the main forced-draft blowers. As shown in that figure, all equipment, components, and connection paths represented by solid

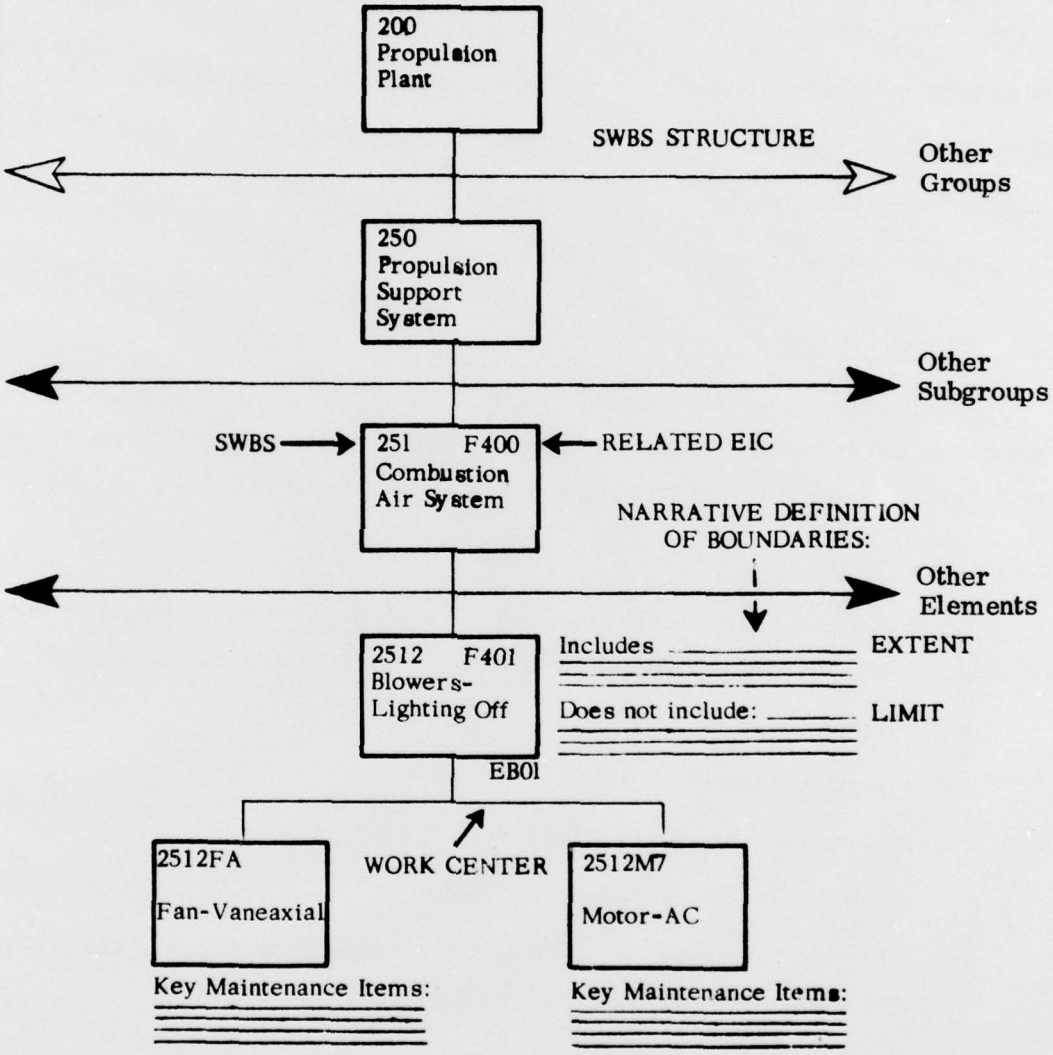

Figure 2. Example of System Diagrams Included in SSDI

lines within the boundary are contained in the particular SWBS (in this case, 2511). Equipment or components shown as broken or dashed lines, even if located within the SWBS boundary, are assigned to another SWBS. (Note for example, the dividing points in the piping lines under "Turbine" in Figure 3.) Tracing the lines to the SWBS boundary will show the interfacing systems, subsystems, or equipments.

Although some of the line diagrams do show functional relationships, that is not their intent – their specific purpose is to aid in identifying the correct SWBS. For this reason the line diagrams are greatly simplified from the actual configuration. In many cases neither the correct number of equipments nor all interconnecting relationships are shown. For example, although two or more identical forced-draft blowers may be used in the combustion air system, only one is shown on the schematic (see Figure 3). This is because all blowers of the same type have the same SWBS number.

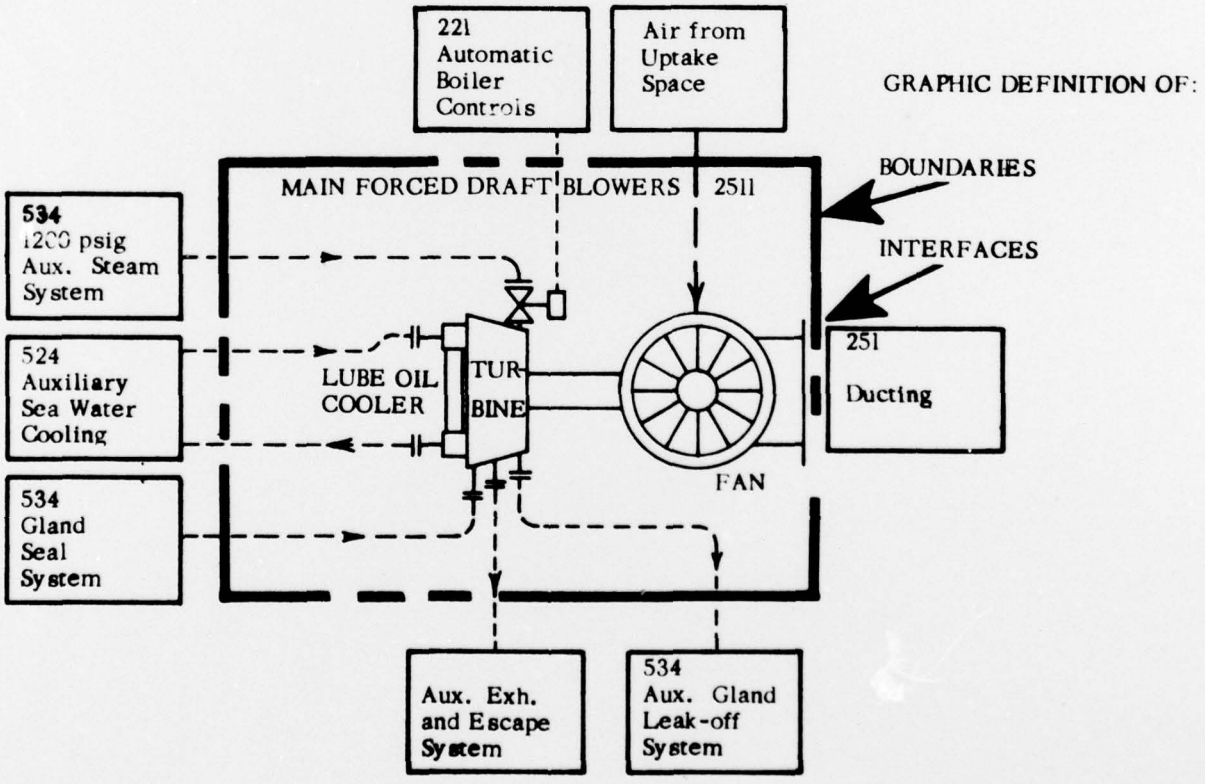

Figure 3. Example of Line Diagrams Included in SSDI

3
POTENTIAL FOR EXPANDED SSDI USAGE

Based on the makeup and current applications of the SSDI, as discussed in Section 2, a number of maintenance management functions and tools were identified as possibilities for expanded application of the SSDI concept. Each of these functions and tools, listed in Table 1, was evaluated as to potential SSDI applications and related benefits or constraints. Where SSDI application was considered feasible and desirable, a test plan was defined for exploring the application.

Results of this investigation are discussed in the following sections.

3.1 3M MAINTENANCE DATA COLLECTION SYSTEM

The EIC Master Index is the present source for assigning identification codes to systems, subsystems, and equipments when documenting maintenance actions for the Maintenance Data Collection System (MDCS). The effectiveness of the MDCS depends to a large extent on the accuracy of the source information, which is sometimes compromised by human errors associated with the nature of the EIC system. The user is required to research the entire EIC index in assigning codes, and the result has been the assigning of many wrong numbers due to lack of knowledge of what certain codes encompass. For example:

a. Some piping system codes also include pumps, driving units, and other components in addition to the piping and valves of the system.

b. There are six separate propulsion system codes.

Another common problem in EIC identification is coding at the wrong level, e.g., at the subsystem instead of the equipment level.

The EIC-structured SSDI provides a more ready means of locating and assigning the correct codes. The SWBS-structured SSDI for DE-1052 class ships provides some cross-reference to the EIC code, but would require additional modification for full compatibility with MDCS. Should SWBS coding be substituted for EIC in the MDCS, full application of the SWBS-coded SSDI could be made.

TABLE 1. MAINTENANCE MANAGEMENT FUNCTIONS/TOOLS

Program	Program Element	Main. Mgmt. Func/Tool
3M	MDCS	Current Ships Maintenance Project (CSMP)
		Material history reports
		Work requests (form 4790/2K)
Ship Overhaul	Overhaul Planning/Preparation	Pre-Overhaul Test and Inspection (POT&I)
		Ship Alteration and Repair Package (SARP)
		Material ordering
		Work packaging
		Shipboard Equipment Configuration and Accounting System (SECAS)
		INSURV deficiency reports
		Drawing/manual indexing and numbering
		Ship Alteration Management Information System (SAMIS)
		Uniform Repetitive Work Request (URWR)*
	Overhaul Accomplishment	Standard work specifications
		Technical Repair Standard (TRS)
		Ship's Force Overhaul Management System (SFOMS)
		Total Ships Test Program
		Shipyard Management Information System (MIS)
		Propulsion Examination Board/ Light-off Examination (PEB/LOE) preparation

*Will be replaced by Ship's Work Authorization Boundaries (SWAB)

- Conclusions: SSDIs structured to the EIC Index support the 3M functions, and should assist in increasing the accuracy of data submitted to the MDCS. The SWBS-structured SSDI, if completely cross-referenced to the EIC, could accomplish the same results. Consideration should therefore be given, when developing new SSDIs, to providing full EIC cross-reference. In summary, the question is not the applicability of the SSDI concept to the 3M functions, but whether 1) SWBS replace EIC in MDCS reporting, or 2) MDCS reporting procedures provide for entering SWBS as well as EIC identifiers.

- Recommendation: Consider adding the SWBS identification code to MDCS reporting documentation.

3.2 SHIP OVERHAUL

3.2.1 Planning and Preparation

Preparation for regular overhaul generally entails the following sequential actions:

a. Determine repair requirements, assess repair priorities, and select accomplishing activities.

b. Determine resources (dollars, manpower, and time).

c. Considering the repair priorities, make tradeoffs between requirements and available resources in terms of manpower, dollars, and time to define that portion of the work package to be accomplished and that portion to be deferred.

d. Prepare a detailed plan for accomplishing the work.

In carrying out these actions, a number of maintenance management functions and tools (as indicated in Table 1) are employed. The effectiveness with which functions and tools could be applied in accomplishing the above actions would be enhanced if there were a common language for correlating them. The application of such a language, SWBS, through the use of the SSDI is discussed in the following paragraphs.

3.2.1.1 Pre-Overhaul Test and Inspection (POT&I)

For each overhaul, a POT&I plan is generated to document the tests and inspections required to compile a comprehensive repair work package and document the rationale for the recommended repairs. These POT&I plans are developed and

assembled by major ship system, with individual inspection records for the maintenance-significant components. These components are assigned the SWBS element (third level) code, and numbered sequentially within this code, e.g., 251-1, 251-2.

Application of the SSDI to POT&I plans would ensure that all components within a system are covered, would identify the functional interfaces associated with testing, and would provide a unique code for each component's inspection record. (The code would be to either the fourth or fifth level, depending on degree of coverage, e.g., 2511 for the forced draft blower, or 2511YR for the FDB turbine.)

- Conclusion: Application of the SSDI to the development of the POT&I plan is feasible, and would provide for better definition of individual inspection records.

- Recommendation: Prepare a POT&I plan for a future overhaul organized to conform with the SSDI.

3.2.1.2 Ship Alteration and Repair Package (SARP)

The Ship Alteration and Repair Package lists alteration and repair work identified for a ship; gives estimated cost data; and serves as the vehicle for presenting work for authorization-to-accomplish decisions. The SARP is assembled by major ship system, utilizing the SWBS in the form of a System Work List Item Number (SWLIN). That document provides the interface between the 3M programs, ship-originated CSMP and/or work requests, and the shipyard accounting system. Application of the SSDI would ensure that specific work is assigned to correct SWLIN, and reduce the possibility of duplication of work items.

SWLINs are written to the level required to describe completely the work to be accomplished. At PHNSY the SWLIN includes equipment identification data, ship name and hull number, applicable system, job title, three narrative sections (scope, job breakdown, and remarks), and estimated manhour and cost data. Using the SSDI, a fifth-level code can be assigned to each job-breakdown line item, providing a more precise data retrieval, job costing, and identification of material required for each operation. Problems can arise, however, if more than one fifth-level component is covered in one work breakdown item. For example, if a pump and motor assembly have two different SWBS codes, the job order can be identified by only one of these codes. Further investigation is required in this area of SSDI application.

- Conclusions: Application of the SSDI to the SARP is feasible (and in fact is being done in a present study program), but further study is needed to obtain the full benefits of applying the SSDI in preparing the SARP.

- Recommendation: Perform an analysis of the present application of SSDI to the SARP of USS WHIPPLE (DE-1062) to identify areas of improvement, and prepare a plan for implementing these improvements on the next SARP prepared.

3.2.1.3 Material Ordering

Once work has been identified in the SARP, advance ordering of material can begin. Job material lists (JMLs) are keyed to the SWLIN and are prepared for each component identification code (CID). A job order number and key operation are also entered on the JML. Using the SSDI to enter a fifth-level code (generally one code per CID) would provide further unique traceability and identification. When a sufficient data bank of material-ordering information for a specific CID has been assembled, a unique fifth-level SSDI code would provide for ready retrieval of material-ordering data and improve the procurement process.

- Conclusion: Application of the SSDI to the material ordering function is feasible, and will be accomplished at PHNSY.

- Recommendations:

  a. Analyze the efforts to date on using the SSDI for material ordering programs, and apply the results to a follow-on overhaul activity.

  b. Continue to construct a material-ordering data bank and assign appropriate SSDI SWBS codes.

3.2.1.4 Work Packaging

The process of work packaging has resulted from studying ways to provide better procedures for work planning and production control. The objective of this process is to divide the overhaul package into logical units of work that fit the manner in which the job will be performed. Packaging is usually done on either a ship-system or ship-area basis. Thus a particular package could include three different categories of work: repair items, alterations, and special project tasks. Work specifications are then prepared for the defined package.

The SSDI as presently structured would not support work packaging on a ship-area basis (e.g., main deck, auxiliary machinery room). However, it is considered a valuable reference document for packaging work by systems or subsystems, and would provide visibility as to interfaces with other systems and subsystems.

- Conclusion: The SSDI can be used as a reference for work packaging by system.

- Recommendation: Use the SSDI as a reference for work packaging by system and document the results. Conduct further study as to its applicability for work packaging by ship area.

3.2.1.5 Shipboard Equipment Validation

SECAS HM&E ship validation aids are identified by CID number. The validation team adds the appropriate SWBS code. Using the SSDI, the validation team could verify that all system components are provided for and that the correct SWBS fifth-level code is assigned at the time of validation.

- Conclusion: The SSDI would be very useful in organizing HM&E validation and ensuring complete coverage by the validation team.

- Recommendations:

  a. Provide SSDIs for use in future ship HM&E validations.

  b. Investigate applications of SSDI for SECAS electronics validations.

3.2.1.6 INSURV Deficiency Reports

Reports of inspections conducted by the Board of Inspection and Survey are organized and numbered in accordance with INSURV procedures. Procedures exist in the 3M program for entering INSURV-identified deficiencies into the MDCS, at which time they are assigned EICs. There is no known plan to revise these procedures to adapt to the SWBS.

- Conclusion: Until SWBS coding is provided for in INSURV reporting, the SSDI is not considered applicable to INSURV operations.

- Recommendation: Provide a copy of the SSDI to INSURV and invite comments concerning possible applications.

3.2.1.7 Drawing/Manual Indexing and Numbering

Navy drawings and manuals are presently identified by SWBS and other coding systems. The SWBS-coded SSDI would be a useful tool in identifying the correct manual for a particular system/equipment. Another helpful aid would be a listing of technical manuals and drawings applicable to each level of the SSDI.

- Conclusion: The SSDI can be used as a reference for identifying drawings and manuals.

- Recommendation: Develop a reference index of plans and manuals for each level of the SSDI.

3.2.1.8 Shipalt Records and SAMIS

Shipalt records have EICs assigned, usually at the system or subsystem level. From a management viewpoint, appropriate SWBS coding would be desirable but this is not considered an area where the SSDI would be applicable. Once an alteration is programmed for accomplishment, an SSDI could be used for SARP coding and identifying system interfaces. Expanding this philosophy to the Ship Alteration Management Information System (SAMIS), no direct application of the SSDI can be identified.

- Conclusions:
  a. Application of the SSDI to SAMIS and shipalt record identification is not feasible.
  b. The SSDI can be used for incorporating alterations into the SARP.

- Recommendation: Conduct further studies of SSDI application to shipalt programs.

3.2.1.9 Uniform Repetitive Work Request (URWR)

NAVSEASYSCOM's program to develop URWRs is another major step in attempting to standardize overhaul planning procedures. The concept is based on developing a standard work request for an SWBS element or subset, e.g., one for boilers and one for automatic boiler controls.

Each URWR attempts to define the total range and boundaries of what is included in the SWBS element or subset, and specifies the work to be provided. However, the URWR does not break the systems down to the level required by its principal users, ship's force and shipyard.

URWRs and SSDIs have similar concepts and goals. If the URWR concept were to be expanded to a finer degree of breakdown, and if the development of new URWRs were coordinated with further development of SSDIs, a strong maintenance management tool would result. PHNSY letter Ser 200-2 of 9 July 1974 to NAVSEASYSCOM explains this concept in greater detail.

- Conclusion: The SSDI and URWR programs are mutually supportive and should be expanded toward full compatibility.

- Recommendation: Conduct a study to prepare a set of revised URWRs related to a current SSDI, realigning the SSDI as required, to result in an effective set of improved documents for material and maintenance management.

3.2.2 Overhaul Accomplishment

Many of the management functions and tools applicable to overhaul planning and preparation continue to apply during the actual overhaul. Still other management aids, as listed in Table 1, are required for this phase. The potential application of SSDI to each of these is discussed in the following paragraphs.

3.2.2.1 Standard Work Specifications

Several studies are in progress in which standard work specifications for shipboard repair work are being developed. Such specifications are usually identified with a five-digit control number, the first three of which are SWBS and the last two a sequence number. Application of the SSDI fifth-level SWBS would provide a more specific tie-in with other types of documentation.

- Conclusion: The SSDI can be applied for the identification of standard work specifications.

- Recommendation: Conduct further study into identifying standard work specifications with a fifth-level SWBS code as more SSDIs (additional ship classes) become available.

3.2.2.2 Technical Repair Standard (TRS)

Technical Repair Standards are intended to provide standard procedures for repairing an equipment and a list of material needed to support the repair. Usually equating to a specific CID number, these TRSs would be applicable to the fifth level of the SSDI.

The SSDI could be used to provide a cross-reference between the equipment and a specific ship system. No application of the SSDI to an individual TRS is envisioned.

- Conclusion: The SSDI can be used to provide a cross-index code between TRSs and ship systems.

- Recommendation: As TRSs are developed, continue to assign SWBS codes for data bank retrieval.

3.2.2.3 Ship's Force Overhaul Management System (SFOMS)

The SFOMS program provides information and methodology for use by ship's force personnel in managing their portion of the overhaul work package. Data processing procedures provide the required reports, which are normally organized by job and work center. SSDI codes should be incorporated into these reports to provide a cross-reference to the shipyard's programs, and can be used by ship's force to ensure that all systems are accounted for. In addition, the incorporation of SSDI codes into SFOMS accounting practices would be extremely useful in establishing and utilizing a SFOMS data bank.

- Conclusion: The SSDI should be used as a reference for additional coding of ship's force work to provide for cross-referencing to other maintenance management programs.

- Recommendation: Continue to apply SSDI concepts to the SFOMS program. Encourage participation by ship's force.

3.2.2.4 Total Ship's Test Program

The SSDI would provide a good reference for use during the planning for the Total Ship's Test Program. With the SSDI used as a checklist, systems could be identified, interfaces determined, and requisite tests and trials defined. Appropriate coding could be used to identify individual portions of the program for various systems and subsystems of the ship.

- Conclusion: The SSDI could be applied to the Total Ship's Test Program.

- Recommendation: Provide the SSDI for reference use by personnel developing total ship tests and trials.

3.2.2.5 Shipyard Management Information System (MIS)

The shipyard Management Information System provides cost, scheduling, planning, production, and material data. As evidenced throughout the previous analyses, use of the SWBS as a common language and the SSDI for further definition with respect to specific ships, would provide useful support to the shipyard MIS.

While SSDI is applicable to specific ships or ship classes, its SWBS orientation assures compatibility with MIS and its additional degree of definition provides for more detailed information when required.

- Conclusion: The SSDI can be applied to the shipyard MIS, and provides an additional degree of definition for overhaul planning and accomplishment for specific ship classes and types for which SSDIs have been prepared.

- Recommendation: Continue to apply SSDI concepts to MIS where applicable.

3.2.2.6 PEB/LOE Preparation

Preparation for PEB/LOE requires a concentrated effort, primarily by ship's force but also by the shipyard. Through the use of management plans and supporting programs such as SFOMS and MIS, the required work is identified, scheduled, and accomplished. In this program, the SSDI can be used as a reference for assuring complete system coverage and identifying system interfaces. Appropriate coding would ensure that the work is accounted for in the management progress reports.

- Conclusion: The SSDI is applicable as a reference document for PEB/LOE preparation.

- Recommendation: Continue to provide SSDIs for use during PEB/LOE preparation.

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Potential applications of the Ship Systems Definition and Index beyond its present usage as an overhaul preparation aid were investigated. A broad spectrum of Navy management functions and tools were examined relative to SSDI applicability, with conclusions and recommendations offered for each.

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